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Cytoskeleton-induced alterations of the lectin activity in winter wheat under cold hardening and abscisic acid (ABA)

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Abstract

The roots and leaves of 7-day seedlings of three winter wheat cultivars differing in frost resistant were used to study changes in lectin activity under cytoskeleton modifiers (DMSO - 7%; colchicine - 1 mM; oryzalin-15 μM; cytochalasin B - 15 μM) of non-hardened (23°C) and hardened (2-3°C, 3-7 day) plants. Plants were grown with ABA (30 μM) or without ABA. Pretreatment with colchicine, oryzalin [inhibitors of microtubules (MT) polymerization], cytochalasin B [inhibitor of microfilament (MF) polymerization] increased the activity of cell wall lectins, although pretreatment with DMSO (stabilizer of microtubules) decreased the activity. Both hardening and ABA decreased the effect of the cytoskeletal modifiers. These results could be explained by the appearance of tolerant MTs with less affinity. It is probable that increase in the activity of cell wall lectins may be the compensatory mechanism which stabilizes the cytoskeleton structure in conditions tending to disrupt it. The genotype with low resistance had higher sensitivity of lectin activity to cytoskeleton modifiers than the frost resistant genotype. The results suggest that leaves have more stable MTs and MFs and stronger MT-MF binding than roots. (C) 2000 Academic Press.

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Keywords

Abscisic acid, Cold hardening, Cytochalasin B, Lectins, Microfilaments, Microtubules, Oryzalin, Triticum aestivum L.